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Fuel of the Future--What Shall It Be?

XXIV. Heat treatment of metals—Further examples of calculations

Ismar Ginsberg

IN the last few installments of the Fuel of the Future Series there have been given in detail a number of examples illustrating how industrial gas calculations are actually carried out in practical work. Each of the illustrations used was obtained from actual practice, representing, in fact, installations which were designed and erected by industrial gas engineers and which are in operation at the present time, or were in operation long enough to indicate that the gas man's design and claims were all that they were represented to be.

The purpose of these examples has been to show the industrial gas engineer how calculations on industrial gas applications were made by a manufacturing concern which has the reputation of conducting its business on a very high standard, and to indicate to them how they themselves perhaps might change their own methods to advantage in going after industrial gas business. There has also been another purpose in mind, and that was to show the industrial gas man the value of making a thorough study of his problem before attempting to solve it, and also of indicating to him how great the ingenuity of the engineer has been in succeeding in getting gaseous fuel into a plant and also in reducing the costs of the entire thermal operation, so that no great difference, if any at all, was entailed by the use of the more expensive gaseous fuel.

A Difficult Problem

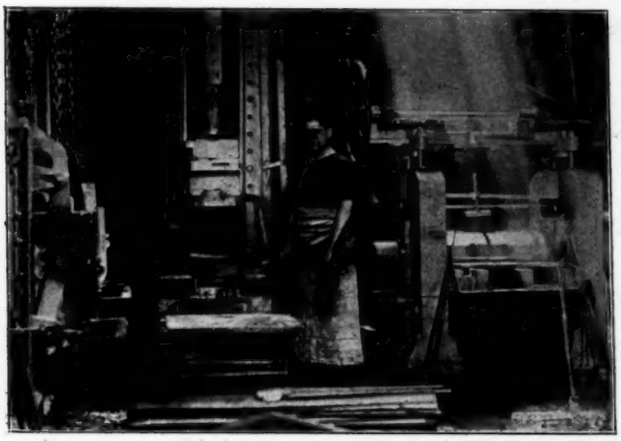
The gas industry is faced today with a difficult and most important problem in developing its industrial gas business. Gas can find use and has found use in so many different industries, whose technology is both involved and entirely different from each other, even though it may essentially be concerned with a thermal problem, that it is really a very difficult matter for any one man or any group of men, comprising an industrial department, to possess sufficient knowledge of all the varied manufacturing processes that are brought to their attention by prospective users of gaseous fuel. It has previously been brought to the attention of industrial gas men that it is necessary for them to arrive at a thorough and entirely comprehensive solution of the thermal problem if they wish eventually to hold the business of the manufacturer whom they are trying to induce to use gaseous fuel. The question arises, where is this knowledge to come from and how is the gas industry to go about the future development of the industrial gas business? It is patently impractical to expect any one man to have a sufficiently intensive knowledge of all the various industries into which gas enters as an industrial fuel, so that a satisfactory solution is obtained, one that solves the thermal problem in its entirety and permanently.

This remains the problem of the gas industry today, and it is easy to see, if one weighs all the facts in the matter, the conditions that surround the industrial fuel business, the competition that the gas man has to meet and overcome before he can sell his fuel, that unless a correct solution of this problem is obtained there can be no really great development in the industrial gas business. It is not that this problem is peculiar to the gas industry, for both the electrical man and the oil man are faced with the same difficulty. They all understand general thermal principles, just as does the gas man, and they understand their fuel as well as the gas man does his, but they cannot be expected to know the intimate details of a manufacturing industry unless they have studied the matter, and, in fact, have worked in the manufacturing establishments themselves so as to gain a really practical knowledge of the thermal processes involved.

Practical Knowledge of Intimate Details Essential

Thus, for example, we may find an industrial gas engineer who is thoroughly familiar with the thermal details of heat treatment, who is properly equipped in the science of metallography and metal-

lurgy, so that he can solve any heat treating job that comes to the gas company and apply gaseous fuel to it successfully. It is quite enough to be able to do this, and, in fact, it may be said that there are really few who have the requisite knowledge of these matters accurately to understand what goes on in heat treatment and successfully to duplicate any structural condition in the metal that it is desired to obain. It can hardly be expected that this man will



Welding Steel Knives

know as well the intimate details of the manufacture of baked enamelled ware or of varnish making, or of brass melting, each of which is an entirely separate industry whose manufacturing processes are surrounded with just as many intricate and essential details and difficult thermal conditions, not only as far as the utilization of the fuel is concerned, but also with respect to the design of the furnace. As there are a great many different industries into which gaseous fuel enters and will enter in the future, if our development keeps on, the question remains, who is to have this intimate knowledge and how is it to be obtained by the gas company that wants extensive industrial gas business? It cannot and must not be thought that the gas company can secure this business in any haphazard manner and expect to hold it for any length of time, if it gets it at all. It must not proceed with any industrial gas installation unless it knows definitely that it is installing the right kind of furnace and effecting all the economies it can in the thermal process. For if it does, it will only be a short time before its business will be lost and its standing and reputation as an industrial fuel factor destroyed.

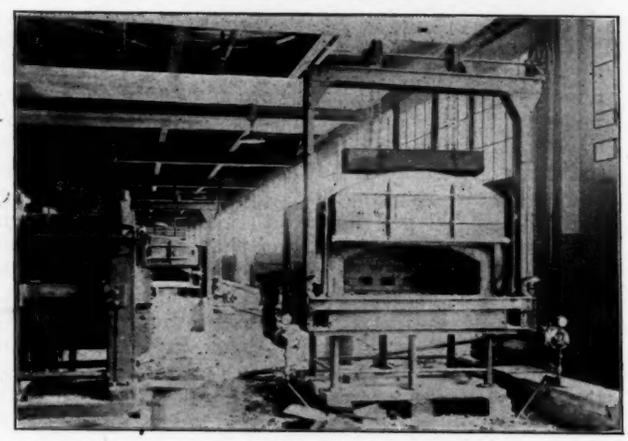
Technical Knowledge of Thermal Processes Essential

Thus the knowledge must be obtained somewhere, and it still quite a problem to determine where and how it shall be forthcoming. But it remains a fact that our industrial gas business must be built upon a solid foundation if it is to endure, and if it is so built there is no question but that it will last as long as the gas ndustry desires it to live. And then, again, the development of industrial business along these lines will be repaid, will include all the manufacturing processes in which heat is used. For the gas industry will then appear, not only as a vendor of gas, but also as an immense storehouse of thermal information which can be drawn upon by any manufacturer who uses fuel in his manufacturing process and who desires to eeffct economies in his operations, as well as increase the efficiency of his processes and enhance the quality of his products.

The examples which we have been giving in these articles on heat treatment of metals are samples of what the gas engineer can do when he makes a thorough study of his problem and when he possesses the proper knowledge of the manufacturing process involved so that he can tackle his problem intelligently and even teach the manufacturer something about the thermal end of his operations which has not been evident to him. Those examples which follow will also be of the same character, and after the general subject of heat treatment has been finished, the author intends to attack in the same manner the other industries in which heat is used as a fuel.

An Example of Forging

The next example which is to be considered is that of a gas-fired forge. This forge was 17 inches wide and 6 inches deep by 6.5 inches high. There was a slot in the forge 12 inches wide by 2 inches high. The work that was carried out in this funnace was to heat 700 pieces of 1.125-inch bars for a period of nine hours. The heating took place over four and one-holf inches of the bar metal and the temperature that was attained was 2,100 degrees F. minimum and 2,300 degrees F. maximum. The weight of the stock was 3.38 pounds per foot per 1.125 inch bar. The pounds of metal that had to be heated for the period of nine hours is then found by multi-



A Heat Treating Furnace for Forge Work

plying 700 by 4.5 by 3.38 and then dividing by 12 to reduce the dimensions from inches to feet. This gives as the net weight of the metal 887 pounds in a period of nine hours, or a total of 98.5 pounds per hour.

In this case it was found that the holding consumption of gas at 600 B.t.u. per hour was 100 cubic feet. It has been explained previously that it is possible in some cases to calculate the holding consumption of the gas-fired apparatus when its characteristics are well known and, when they are not, it is necessary to carry out a test on the furnace and determine the figure experimentally. This is what was done in this case.

Thermal Calculations

The available heat in the gases of combustion at a temperature of 2,400 degrees C. was found to be 230 B.t.u. This can be found from the curve sheet showing available heat in bases of combustion which has been given in a previous article of this series. Then, again, the heat required to heat up 98.5 pounds of metal to a temperature of 2,100 degreees F. may be found by first determining the B.t.u. that are required per pound per metal. This is found to be 380 B.t.u. Then the cubic feet of 600 B.t.u. gas that are required for the heating operation is equal to $\frac{98.5 \times 380}{230}$, or a total of 163 cubic feet of the gas.

The total amount of gas that is then required for the operation is, as usual, the sum of the holding consumption of gas and the gas required to heat the metal up to the holding temperature, that is, 100 plus 163, or a total of 263 cubic feet of 600 B.t.u. gas, which is equivalent to 243 cubic feet of 650 B.t.u. gas.

Box Annealing Furnace

The box annealing furnace in this example is employed in the heat treatment of monel metal. In this particular case, in which gas was to be used as a fuel in the furnace, the depth of the latter was 16 feet, the width 9 feet and the height 7 feet and 3 inches to the spring and 8 feet 5 inches to the crown. The furnace was to have a double swing door at one end. This swing door was to be 7 feet wide and 8 feet high to the crown. The charge that was introduced into the furnace was supported on three rows of pillars, which extended down its length. The charging was to be carried out automatically with the aid of a standard type of charging machine.

The work which was charged into the box annealing furnace was 15 tons of monel metal, or nickel steel. The steel sheets were contained in a box which had a cast steel bottom and sides. The burners that burned the gaseous fuel in this furnace were of the refractory bed type and were placed on each side of the furnace near the bottom. The flue gases passed out at the bottom center through a duct which ran to the rear of the furnace and out through the stake in the rear wall. The burners were separated by distances of two feet and the buck stays which were employed for strengthening the apparatus were spaced four feet apart. The walls of the furnace were made of nine-inch firebrick with a two and one-inch insulation.

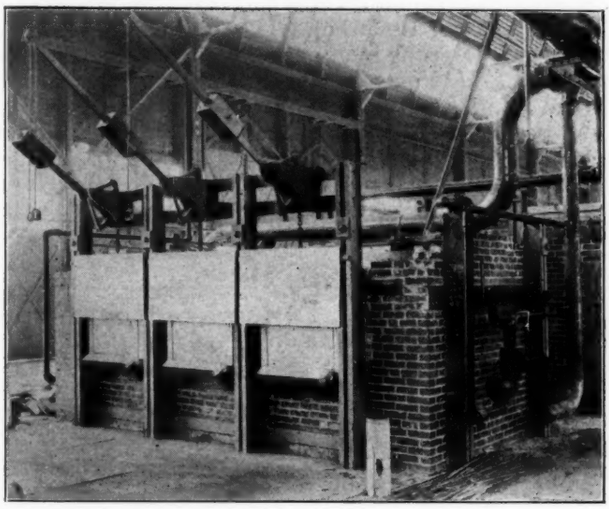
Nature of Box Annealing

Box annealing is the process, it will be remembered, in which the masses of metal are placed in a rectangular box or pot, which is made of cast iron or of plates that are riveted together. The purpose of carrying out the operation in a box is to avoid injuring the finished surface of the metal. Sometimes the box is lined with some refractory substance as silica brick. The metal is packed into the box and then filled in with some material such as ground mica, sand, charcoal, charred bone or leather, lime, etc. The box is covered and placed in the furnace and after the heating is completed the box is removed from the apparatus and allowed to cool to the room temperature.

Operating Details and Calculations

In the particular box annealing furnace in question the time of heating was 30 hours. This time period included both heating and cooling. The minimum temperature that was maintained in the furnace was 1,500 degrees F. and the maximum temperature attained therein was 1,800 degrees F. The thermal value of the gas employed for this purpose, which was a natural gas, was 1,100 B.t.u. per cubic foot.

It is first necessary to find the internal area of the furnace. The furnace is 9½ feet wide and the height is 8 feet. Therefore, the area of these two walls will be $2 \times 9.5 \times 8$, or 152 square feet. The rest of the calculation of the furnace area is more complicated and takes into consideration the variation in the contour. It is not necessary to go into details on this point as the calculations are simple and well known. The area obtained is 545 square feet, which gives a total of 545 plus 152, or 697 square feet. This is the internal area of the furnace.



Box Annealing Furnaces for Monel Metal

It is then necessary to find the holding temperature consumption of gas, that is, the gas that must be burned in order to maintain a definite temperature within the furnace. In this particular case this gaseous consumption was figured, both for the maximum temperature of 1,800 degrees F. and for the minimum temperature of 1,500 degrees F.

Holding Temperature Calculations

In a previous article on the calculation of gaseous consumption required in heat treating operations, a curve sheet was given which showed the radiation losses incurred in a furnace with average insulation at different temperatures. In the case of a temperature of 1,500 degrees F., this radiation loss will be found to be 3.5 cubic feet per square foot per hour and when the temperature is as high as 1,800 degrees F. the radiation loss becomes 5.5 cubic feet per square foot per hour. These figures really mean that so many cubic feet of gas will have to be burned to take care of the radiation loss, or, in other words, this is the holding consumption of gas, for the heat losses are considered to be mainly radiation losses. The aforementioned figures refer to a 600 B.t.u. gas. It is necessary to convert these figures into ones that

(Continued on page 100)

Metering Large Volumes of Gas*

A new system of automatically controlled rotary-diaphragm meters

R. L. Manier

Industrial Heat Engineer, the Syracuse Lighting Co., Inc.

THIS subject presents two distinct sides to the industrial heat engineer: First, his company's accurate measurement of all gas used, and second, such a type of meter or meters that will most please the customer.

Most utilities have some form of industrial or wholesale rate which applies to all gas used through one service and meter. The rate may be of the so-called block or sliding scale form, or of the two or three-part type. In any case, the measurement of the actual cubic feet of gas used is desired. It is with that part of the metering with which this paper deals.

Although the rates state that only such gas as passes through one service and meter should derive the benefits of the wholesale rate, very often it is necessary to group meter readings from one or more services. This may be due to the inability to supply enough gas through one service with existing mains and due to the fact that at the present stage of the art, few companies stock meters large enough to meter all demands encountered and therefore group their largest stock meters in parallel with common inlet and outlet manifold.

Diaphragm Meters

At the present time, diaphragm meters with tin cases can be obtained with unit capacities up to 3,400 cu. ft. per hour. With the "C" type construction of double diaphragms, capacities as high as 17,500 cu. ft. per unit can be obtained. When still larger capacities are required in single units, one has to go to the wet station type of meter, rotary displacement meter, Thomas meter or proportional meter.

Of the single unit meters, the following seems to be true: Diaphragm meters with proper attention will give accurate record of all gas used from the lowest rates up to full capacity. This type of meter seems to be most used, doubtless due to its accuracy, light weight, and to the fact that it is an outgrowth of the smaller capacity meters with which we are most familiar. The capacity of this type limits its use to installations requiring not to exceed 17,500 cu. ft. per hour. The drum or station meter is accurate provided the water is maintained at proper level. Its objection is bulk and weight, with the possible faulty operation of water feed and necessity of safeguarding against freezing. The rotary displacement meters are gaining favor, due to their low cost per capacity, small bulk and low maintenance. Their main drawback seems to be inaccuracy at low rates of flow, due to slippage. Thomas meters have been used on industrial installations. Proportional meters are used extensively in the natural gas regions, but to our knowledge not to any extent with manufactured gas.

Use of Meters in Groups

At the present date, wherever the utility has that privilege, it seems to tend to standardize on certain size meters, not going above a particular size, which is determined by the capacity required for its average large customer. This size meter is then used in groups for metering gas on larger installations.

Such groups may consist of from two to as many as fifty meters or more. This takes up a decided amount of space in the customer's factory and requires a large investment in meters and piping. It has the advantage of flexibility in being able at all times to change meters for test or repair without interrupting service to the customer, as each meter should have valve at inlet and outlet. In some cases the meters are grouped in tiers along the wall. This has the disadvantage of difficult reading and changing of meters. It is most desirable in our experience to place meters clear of the floor on adjustable pipe standards, having as many rows of meters as necessary, with aisles between the rows for reading and removing meters.

The Customer's Viewpoint

Now, to look at the present group practice from the customer's viewpoint. He wants continuity of service with minimum loss of floor space. The industrial engineer must approach the manager, or proper party, and request room for proper meters at head of service. The customer can be shown the advisability of several units in parallel to avoid loss of production while changing meters. However, he dislikes to lose that valuable floor space. When he hears the size and number of meters he may show signs of heart failure for fear of excessive gas bills. Many a booster's enthusiasm has been dampened by the sight of a large array of meters. It is, therefore, advisable to devise some nature of metering which will be inconspicuous, compact and accurate.

As we all know, diaphragms will become porous and leak, valves will stick and something or other may occur with a diaphragm meter. These troubles do not often occur, but may be expected at times. For this reason it is not practical to purchase one large meter for a particular job unless you have enough customers of this size to warrant keeping at least one spare meter of this size on hand for emergency use. Should a meter go bad and you had none to replace it, you would doubtless have to by-pass unmetered gas to keep up production or run a good risk of losing a good customer. Neither outlook is encouraging.

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*Address delivered at the meeting of the Gas Section of the Empire State Gas & Electric Association, Utica, N. Y., March 6.

GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

William H. Matlack

SHE SAYS ACTION GETS HER ORDER

A HOME manager told the writer the other day that the one thing that provoked her most of all in connection with making purchases for the institution she represents was lack of attention on the part of retail clerks (sometimes called salespeople). This brings to mind a story that we heard. A man entered a "gents' furnishing emporium" and stood around for 10 or 15 minutes while a clerk (salesperson) busied himself writing something at the counter at which he stood. When the man started to move away, he said, "What is it?" This added insult to injury, and the man replied, "I don't know; I did not see it," which retort rather brought the clerk right about face and caused him to ask, "Something for you"—and this was the straw that broke the camel's back, for Mr. Man turned and walked out. As he went, he said: "No, I think I got in the wrong place."

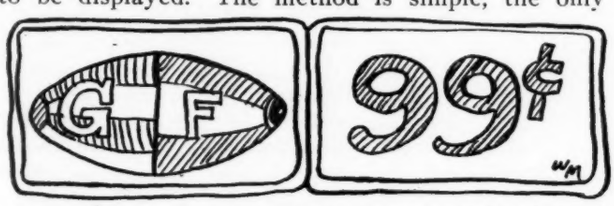
"Put it to yourself," said the home manager we were talking to. "Is it not true that indifference of this sort provokes you to the point where you avoid stores, as much as is possible, where the clerks show indifference? Don't you think you buy much more and oftener when you get attention?"

ECONOMICAL WINDOW PROPERTIES—A SUGGESTION ON HOW TO MAKE THEM

"WINDOW displays cost too much," say some merchandising men. "The backgrounds and window properties cost like blazes." Just what the "cost" is we do not know, while, on the other hand, it has been our experience that, no matter what it costs to tastefully decorate show windows, it is not half as expensive as having them undecorated. The space occupied by show windows on a pro rata basis is the most expensive part of the store, figured on a per square foot basis, if no displays are installed, while if tastefully decorated and frequently changed, it is the most profitable area occupied by the dealer. Attractively expose your wares to people passing your store and you will find that they will be taken away from you.

MAKE YOUR OWN PROPERTIES

WITH a good sharp knife, a few sheets of corrugated board, a couple of brushes and a half dozen jars of water colors, it is possible to work up all kinds of properties, anything from huge letters and figures to "cut-outs" of trees and other objects to enhance the setting for the merchandise to be displayed. The method is simple, the only thing that requires any skill is the rough sketches of the object or figure to be cut out, for, after this has been done, it is but a matter of running the knife around the pencil outlines and applying the colors.



The sketch shown here illustrates two pieces of property that added to the display of a Southern gas company's window, the total of which was but a few cents, and it did not take over an hour's time to make either of them. Both the 99c and the football were suspended from the top of the window and anchored close to the inside of the glass by the use of piano wire.

INSERTS OF INTEREST

ONE of the Western gas companies has adopted a policy of employing advertising in every department. They use advertisements on all gas bills, car cards, billboards; they employ and use liberal newspaper space, and, "best of all," says the Home Service Director, "we never send out a bill, statement, letter, or even an order, that does not contain one of our little recipe folders." These littel folders, about two inches by four inches, and of four pages, when folded, tell the home manager

HOW to bake different kinds of pies, cakes, bread, how to make salads, candy and furnish suggested menus. Every one of them "tells HOW some cooking job is done." They suggest things to her—make her "mouth water—they sound so good," and first thing she knows she is trying this recipe or that one and the company's per meter sendout is hitting 'em up to the 50 per cent increase mark.

The use of small folders has always been productive of good results, for they sell by suggestion. Along about 1915 Herbert Donson (at that time) the new business manager for the Consolidated Gas & Electric Company, Baltimore, used folders of this type by the thousands, and since then other companies have used them with good results. The Peoples Gas Light & Coke Company, Chicago, hafe distributed some mighty attractive "How" folders quite recently and they must have gotten results or J. F. Weedon, advertising manager, would have found it out after printing the first one and they'd have stopped forthwith.

SIGNATURE CUTS SET 'EM OFF

NOT long ago we were looking over a collection of gas company advertisements trying to figure out just why some of them stood out from the crowd, consideration being given "make up" or lay-out alone. What is the one idea that gets some of the advertisements the second look and the reading, we asked, what is it that sets 'em off? Obviously the answer was balance, between illustration, type, border and signature. Then when we investigated a little farther we found that, as a rule, the advertisements that employed a set or special signaure seemed to go over better. They contained news and generally were better advertisements. The question that then came up was Why? and like a flash the answer came with it. The man who thinks enough about his advertising to spend time and money to design a signature cut or set-up rarely fails to study the other factors that make for newsy advertising copy and neat layout, properly balanced.

Making It Easy for Customers to Pay*

How a gas company endeavors thereby to retain good will

Herman E. Wolff

IN receiving payment of bills, as in other relations with the public, there is a constant effort by all Columbia System companies to give customers every possible convenience and advantage.

Having in view the safeguarding of customers' interests under all conditions the company gives special attention to payments received through the mails, which, in some instances, could not be credited to customers' accounts because of some essential detail inadvertently overlooked by the senders.

Remittances Without Information

Remittances of this kind, which would be very puzzling under ordinary circumstances, are turned over to an employee trained to handle that particular type of mail. This clerk leaves no stone unturned in the effort to supply needed information that the customer has failed to give.

It should be interesting to the gas and electric user to know that the company cheerfully gives this exceptional service, although, of course, the customer sending a remittance should exercise every care in making it clear what his remittance is intended to pay.

In the solution of puzzling payments, the clerk assigned to this duty may have recourse to the company's ledgers, city and telephone directories, the Post-office Department, banks on which checks were drawn, agencies where money orders were issued and various other sources which depend upon the particular mystery surrounding the individual case.

Delivering the Bills

Gas and electric bills are delivered to the premises of customers by the company's corps of thirty-four meter readers. The dates of delivery are seven to ten days after meter readings have been made. The schedule, both for readings and bill deliveries, is uniform throughout the months of the year, each of the six districts in the Cncinnati area having its definitely stated period in which these details are executed.

Charges for Merchandise

It should be here mentioned that if the customer is purchasing electric or gas appliances, or paying for wiring and fixtures, in monthly instalments, stickers are attached to the gas and electric bills to show these amounts, so that such payments may be met at the same time the customer takes care of his regular service bills. This arrangement is designed to accommodate the public quite as much as it is intended to simplify the collection of accounts by the company.

After wiring and placing of fixtures have been done, or appliances have been delivered, the company mails the customer statements that cover the accounts in full. The customer has the option of paying these in one sum at a discount or of meeting them in monthly instalments, the amount of which latter is also indicated on the statements, as well as on the stickers later attached to gas and electric bills.

Ledger Accounts

Five separate ledger accounts are carried by the company, as follows:—Gas Service, Electric Service, Wiring and Fixtures, Appliances, Accounts Receivable. We have already explained the first four; the last covers repairs and so on. Thus, it will be seen, that any customer's name may appear on five different ledgers, which might easily lead to confusion but for the fact that modern simplified methods of bookkeeping are followed.

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*From "Hail Columbia".

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

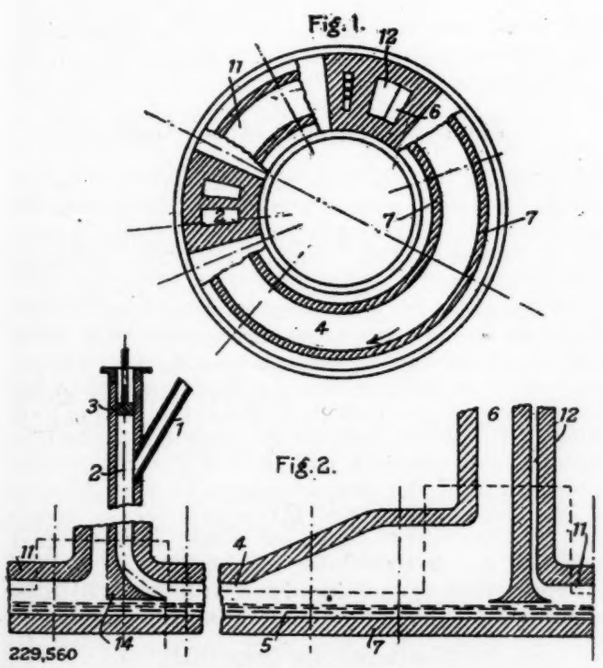
RETORT FOR LOW TEMPERATURE CARBONIZATION

A RETORT is formed of two vertical concentric cylinders of which the outer rotates. The outer cylinder has a series of shelves on its inner surface, and the inner cylinder has on its outer surface a series of corresponding rakes. The material under treatment is introduced at the top into the annular space, and is guided by the rakes from shelf to shelf. Heating chambers are provided outside the outer and inside the inner cylinder. There are also means for drawing off the products of distillation at different levels and for preheating the material to be distilled. The constant movement of the material under treatment prevents overheating and decomposition of the products.—German Patent No. 403,857.

WATER GAS MANUFACTURE

THE apparatus is for obtaining water gas or producer gas from the residue remaining after the production of gas from bituminous substances. Dry coal containing little moisture, bitumen, and gas, e.g., anthracite coal, may also be treated in this apparatus. The fuel is finely ground and blown into a closed chamber containing red-hot liquid slag which preferably flows in a stream through the chamber. In the production of producer gas, the proportion of air and carbon blown into the chamber may not be exactly uniform and local explosions may occur which will disturb the uniform production of gas. This may be avoided by adding incombustible gas to the powdered fuel. This addition of incombustible material also facilitates the production of water gas by its catalytic action.

Fig. 1 shows a section plan of the apparatus and Fig. 2 a developed sectional elevation. Fuel dust and highly superheated steam are blown in through the passage 1, and mixed in the passage 2 by the reciprocation of the piston 3. The mixture then passes into the chamber 4 containing red-hot liquid slag 5, which supplies the heat for gasification. This is completed in the enlarged portion of the chamber 4, in which the speed of the gas is reduced, and slag is allowed to settle on the slag bath. The gas is drawn off through the passage 6. The trough 7 containing the slag is continuously rotated, and the cooled slag is reheated in the chamber 11 by the combustion of gas and air in that chamber admitted through the pipe 12. The chambers 4, 11, are separated by the partition 14. By this process entirely dry producer gas may be obtained, and water gas may be obtained continuously.—(British Patent No. 229,500.)



HYDROGENATING COAL BY THE BERGIUS PROCESS

POWDERED coal was subjected to the action of hydrogen under pressure at temperatures of 400-500 degrees, according to Bergius' method. The yields of liquid products were greater than those obtained by low-temperature carbonization. The oily liquids obtained contained up to 20 per cent of phenols in addition to hydrocarbons. These phenols are not derived from the decomposition of low-temperature tar, since they are produced also by the hydrogenation of the semi-coke obtained from lignite, which yields 30-40 per cent of oil recoverable by distillation. Bituminous coking coals are more resistant to hydrogenation than other types, probably owing to the formation of lumps during the carbonization which goes on. Tables are given showing the distribution of the hydrogen between the liquid, solid and gaseous end products. The course of the hydrogenation is influenced largely by physical as well as by chemical factors.—(Bronnstoff Chem., 1925, pages 69-79.)

Some House Heating Experiences*

Results obtained by a gas company with a good industrial load

D. H. Frazer Jr.

Battle Creek, Mich.

ABOUT forty per cent of the total load at Battle Creek is industrial gas. The maximum use of this occurs during the summer months as shown by the attached load curve. For this reason, any load which we can take on during the winter takes the place of our summer use of industrial gas at 65 cents. Since our plant investment and overhead expense are necessarily present because of the industrial load, any househeating business that we can take on becomes exceedingly attractive and profitable.

All of our customers were extremely well pleased, however, and would not permit us to take their all now co-operating with us.

During the summer of 1924, we decided that in Battle Creek, at least, househeating was a very desirable load and that we would go after the business which seemed to be waiting for us. We installed five hot water boilers, one vapor boiler and two hot air furnaces during the fall and winter of 1924 at actual cost. Whether this is a desirable policy or not, we are not prepared to say, but at any rate, it gave us a good start and the information we wished to get.

We estimated the cost of operating the installation on the basis that I will explain later. In most cases the actual cost exceeded our estimate, due to the especially long and severe winter through which we have just passed and also to the fact that a number of the home owners kept their homes at temperatures ranging from 72 to 75 degrees instead of 70 degrees, on which basis the estimates were made. We have since reduced our rate from 75 cents to 65 cents per thousand and at the new rate, all of the installations will be within the estimate which we made.

Customers Were Pleased

boilers out even though it was going to cost them considerably more than it now does, because of the great inconvenience which necessarily follows where gas is used for heating. In one case in particular, we made an estimate of $600 as the total cost of heating for the season. It now appears that this customer will use about a million feet of gas, which, at 65 cents, is $650, and at 75 cents, our previous rate, would be $750. The customer, however, still intended to keep the boiler and pay $750 a year for heat before we announced our rate reduction. He said that it had been impossible to keep his home warm before he used gas and that he would not take the boiler out under any circumstances. His attitude is characteristic of that of all gas-fired boiler owners. The great convenience and cleanliness gives so much satisfaction that the home owner is willing to pay a very high price for it.

Co-operation of Steamfitters

We started off our spring campaign by soliciting the co-operation of all of the steamfitters, which we have received. It not being advisable for a company the size of ours to put in a plumbing department, we wished the steamfitters to make the installations for us. This results in a nice profit for them and a lower cost to the consumer than would result if we added a profit to the cost of the boiler before we sold it to the steamfitter. The boilers are quite expensive in any event and our desire is to keep the cost to the consumer as low as possible and make our profit from the sale of gas rather than from the sale of the appliances. We find that the steamfitters welcomed the gas boilers because nearly all of them had had extremely unpleasant experiences with the oil burners, all of the profit they made on the original sale being eaten up later in free service and maintenance. We have a very competent hot-air furnace man in our shop and he is installing hot-air furnaces on replacement jobs for us. Any new jobs are worked out by some local hot-air contractor with our assistance. Obviously the most desirable way of handling the matter would be to have a separate department under the direction of a capable operating engineer, but for most companies the expense of such a department would be so high as to make it impossible of accomplishment.

Estimating Amount of Gas Used

Estimating the gas consumption from the amount of fuel previously used is a fairly satisfactory method where the characteristics of the home owner are not known. One ton of coal as ordinarily burned, is equal to 30,000 cubic feet of gas as ordinarily burned. The customer using 20 tons of fuel, therefore, would use approximately 600,000 cubic feet of gas during the heating season. Our experience seems to indicate that a compromise taken between the consumption figured on the tons-of-fuel basis, if it is lower, and the consumption figured on the radiation installed will be fairly accurate. In other words, if the customer says he uses 18 tons of fuel and has installed 1,000 square feet of radiation in a hot water plant, we would estimate that he would use 600,000 cubic feet of gas. If he had 800 cubic feet of radiation and still used 18 tons of fuel, we would make the estimate on the fuel

(Continued on page 102)

*Paper prepared for Thirty-third Annual Meeting, Michigan Gas Association, June 25, 26, 27, 1925, Mackinac Island.

As The Journal Views It

HOME SERVICE

One of the most important developments that has taken place within recent years in the gas industry has been the establishment of the Home Service Department. In fact, it may be said that the real value of Home Service is neither as yet entirely appreciated nor completely understood. It is a subject which is occupying the minds of gas executives today, and it should do so, for through Home Service it is possible for the gas utility not only to increase its business, but also to create and enhance favorable sentiment among its customers, and thus establish a firm foundation on which to build the greater gas structure.

It may seem to some that Home Service entails an expense which cannot be justified, or, at least, cannot be counterbalanced, on what may be considered the right side of the ledger, with some definite advantageous result. This may be true, for it is a very difficult matter to trace back to its beginning any new source of business that the gas utility may acquire, or the development of a friendly spirit among its customers. In both instances there may be many factors that work together to produce the results and, accordingly, it becomes an almost impossible task to differentiate between these factors and their proportionate potency in accomplishing results.

This, of course, is not the most idealistic way in which the gas company should look upon its Home Service work, but, on the other hand, it cannot be blamed for analyzing the work it does for its customers and attempting to correlate this work with some tangible evidence of actual beneficial accomplishment acting towards its aggrandizement in one way or another.

It remains, however, that the gas utility in rendering Home Service, does something for which it should be justly proud. In fact, it is a most altruistic action and there are but few examples of human enterprise that can show a service that equals, in its whole-hearted humanness, the work of Home Service. The gas company, through its Home Service Department, exercises a most wonderful influence on the housewife and her difficulties and troubles. There are many instances where Home Service Workers have performed duties, essentially sociological and very far removed from what is generally expected the gas company should do for its customers. There are many cases where the Home Service Department has gone very far afield to help gas customers. And this does not refer to teaching the housewife how to cook or how to use her gas range to better advantage, but more to giving domestic advice, aye, to solving marital problems, to aiding the housewife to perform various duties, to giving advice on how to prepare for the "party," and to solving other household problems of intimate character.

Of course, it naturally follows that when the gas company undertakes Home Service and sends its women workers out among its customers, they will find conditions wherein they can render real service, and service, to be sure, that they are not expected to give at all. And they never refuse to do so, and in thus being really human and ready to help those who require assistance they not only build for their company a foundation on which greater sales of gas and gas appliances may be based, but—and, what is more important in the last analysis—they also create for the gas company a feeling of greater respect, admiration and appreciation for what it stands for in the community.

This is the real function of Home Service. Those gas companies who are so fortunate as to have Home Service Departments, which function in the proper manner, have already noticed in the short time that this development has been in existence that the people of their community are not only glad to buy gas and gas appliances, not only willing to listen to salesmen who want to sell them securities of the gas company, but are filled with the strong feeling of good-will and friendship toward it. On such a foundation the gas utility can proceed safely to erect its greater enterprise!

Advertising Versus Fire--An Inclusive Analogy

Bearing upon the old proverb that an excellant servant does not always make a perfect master

Charles H. Marshall

TODAY we hear a great deal about psychology. On every hand we have thrown at us the psychology of selling, of appeal, of advertising—of anything at all. We get it from our papers; we get it from our friends; we get it from the pulpit. And, as is so often the case, most people have lost sight of the meaning of the word. It would hardly be an exaggeration to say that nearly everybody thinks that psychology has to do with that never satisfactory and almost meaningless expression, "human nature." Others think that it has to do with anything that is peculiar or unique—exotic. And, again, without much fear of exaggeration, still others harbor the thought that psychology is the thing that explains the peculiar temperament of so many people. You may laugh at this last, but it is true. The meaning of the word, however, is a study of the mind, the science of the human mind and its operations.

Advertising Dependent on Psychology

Advertising is very dependent on psychology, and in this wise: The appeal of an advertisement is purely mental. A copy writer should realize that there is this difference between selling in person and in print. Personal factors enter into personal salesmanship that alter the purely mental appeal that the object to be sold creates in the mind of the prospective purchaser. Just as soon as a copy writer sees this difference, just so soon will his copy cease to make appeals and begin to make sales.

The part that psychology plays can best be shown by visualizing a man reading his favorite newspaper or magazine. When he is doing this his mental activities may be more or less dormant, depending on what he is reading and under what circumstances. Anyway, it must be granted that he is not apt to be in the mood to consider the purchase of a new water heater or gas range. And so the advertisement of the appliance makes no impression on him unless there is something in that advertisement to jar his mental repose more than slightly. An idea must be brought up in his mind, and it is the bringing up of this idea that is known as psychology. Benign professors may think that this definition is far-fetched and limited, but to all practical purposes it will suffice the advertising man of the gas company.

The application of psychology does not stop after the idea has been crystallized, either. For there are apt to be many things that will turn a man from your advertisement after you have attracted that first fleeting glance to it. Illustration, layout, headlines, type—all have their place in the advertisement, and it is these that will react psychologically on the man's mind and either make a sale for you or cause him to turn the page. Let us now look at some of the different things that can be done in advertising that will cause the reaction.

How Reaction May Be Obtained

One of the oldest methods of bringing up an idea in a person's mind is through an appeal to the sense of beauty. For every mind has this sense—not of beauty, meaning pretty, but beauty as a more inclusive thing. The first essential is to have a clean-looking advertisement. A mass and jumble of type looks messy, and no mind can be brought to read it without effort, and there must be no cause for effort if a copy-writer is seeking to sell. Anything unique is more apt to catch the eye than the purely conventional. But, in parallel, anything freaky is just as sure to give the impression that the product advertised is freaky. That is how the human mind functions. So it is better to use a headline reading "Gas Ranges for Sale" rather than one that is sensational and irrevalent to the idea in the copy. But how much better it is to use a caption like "Does Your Wife Need a Gas Range?" or "Does Temperature Control Mean Anything to You?"

Truthfulness in Advertising

This leads up to another point that is important—and that is truthfulness in advertising. A lie in a piece of copy not only causes economic waste, but it also hurts the company's integrity. And, to return to our reader—how will a lie in an advertisement affect him? Surely, not much imagination is needed to show his reaction.

In writing copy, untruths are apt to come from two sources. One is the deliberate misrepresentation of facts, that should never be tolerated, and the other is from lack of knowledge of the merchandise to be sold. No sales manager will let his floor salesman say that this range will do such and such if it is not true, and the same sales manager should not let his copy-writer say it in an advertisement.

The Technical Details of the Advertisement

A person who writes advertisements for a gas company should always bear in mind the fact that the copy is to appear in a newspaper or magazine of a certain type. And he should make his layout to conform to the makeup of the paper. A question to show this—can you imagine how incongruous a layout made for the Saturday Evening Post would look in a weekly country newspaper? A study of the medium makeup must be made if space is to be utilized to the best of advantage, for the reader will surely be displeased with an advertisement that throws the rest of the paper off balance.

A great problem of advertising is the amount of space to be taken. Gas companies usually take small space and it is well to bear in mind the fact that it is wasteful to take larger space than necessary, but it is not half as wasteful as putting poor copy in any space at all.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT YOU CAN DO IT BETTER WITH GAS

Lesson No. 81

Heat and Change of State

An Experiment on Boiling

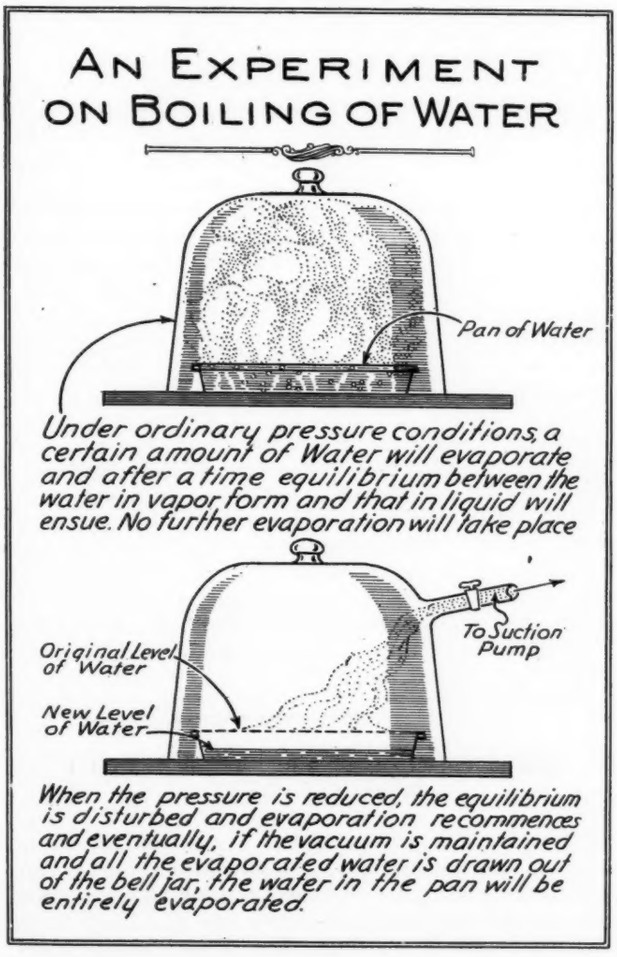
An interesting experiment which points out clearly the relation that exists between evaporation of a liquid and the pressure that exists in the air above it can be carried out by placing a definite amount of water, for example, in a container and exhausting the air above the liquid by means of a vacuum pump. A certain amount of the liquid will evaporate, due to the lessening of the pressure of the air on the surface and flying off into the air.

This has been explained to be due to the kinetic energy of these particles. But as soon as the air pressure is reduced the particles have greater freedom to leave the liquid and evaporate into the space above the liquid. This process goes on until a certain proportion of the liquid is found in the vapor condition in the air space. Thereupon equilibrium ensues, and in fact just as many particles of water rebound from the sides of the vessel and enter the body of the liquid as leave the liquid and enter the air space. This equilibrium continues undisturbed until the pressure conditions are changed.

Thus, if the vacuum is increased, then a greater amount of the liquid particles are able to enter the gaseous phase, but if the pressure is increased, then the proportion of the water particles in the air space is reduced. It is possible by continually reducing the pressure and removing the vapors that are evolved finally to remove all the water, or, in other words, to convert all of the liquid water into the vapor state.

This is the principle on which vacuum driers are built, machines that are used to remove the water from various substances which cannot be heated up to within the boiling point of water for a variety of reasons. The vacuum allows the moisture to evaporate and as the vapors are continually withdrawn the equilibrium that would otherwise be established, as indicated above, is continually destroyed, and eventually all of the moisture is removed.

The same factors apply to the case of the evaporation of moisture from wet clothes, hung up on the line to dry, or to the evaporation of water in a pan which is exposed to the air. The rate at which the water is removed will depend, not only on the temperature of the air, but also on the rapidity with which the evaporated water is removed from the vicinity of the pan of water or the clothes on the line. Thus the pan of water is exposed to air in a confined space. It will soon be seen that the water will not evaporate rapidly and at a certain point it may also be possible that all evaporation will cease. **An equilibrium will be established here as well.**


AN EXPERIMENT
ON BOILING OF WATER
Pan of Water
Under ordinary pressure conditions, a certain amount of Water will evaporate and after a time equilibrium between the water in vapor form and that in liquid will ensue. No further evaporation will take place
Original Level of Water
New Level of Water
To Suction Pump
When the pressure is reduced, the equilibrium is disturbed and evaporation recommences and eventually, if the vacuum is maintained and all the evaporated water is drawn out of the bell jar, the water in the pan will be entirely evaporated.

Likewise, the humidity in the air has a very important effect on the rate at which evaporation takes place. On a very humid day there is scarcely any evaporation at all, and, of course, when precipitation takes place, that is, when it rains or snows, no evaporation can take place. Thus the clothes do not dry.

But in all these cases it must not be supposed that the conversion from the liquid to the gaseous condition takes place without the consumption of heat. This would be contrary to natural law, if such was the case. That it is not has been shown above. The heat is consumed just the same, but the rate at which it is consumed is so slow that it is not noticeable.

SPONGES "DE-SOAKED" BY GAS HEAT

An engineer, talking before an audience of laymen recently, defied his listeners to mention any article used in industry or in the home that is not, at some stage of its preparation, subjected to the application of heat.

"Without heat," he pointed out, "scarcely one of the conveniences of modern life would have been possible."

"But," objected one, "how about sponges?"

Even the engineer was stumped for a moment until a gentleman sitting near the center of the auditorium got up and said he thought he could answer the question.

"I am an importer of sponges," he said, "and we have in New York an entire plant devoted solely to the preparation and finishing of sponges for the market. The most important part of this is done with heat.

"First the sponges are washed in large troughs of luke-warm water which has been rendered slightly acid. A gas-fired boiler supplies this water and also the immediate hot water requirements of the building. After washing, the sponges are drained and then placed in a specially constructed drying room to be dried by a current of warm air. The air required to perform this work is heated by gas in an indirect air heater, which, when operating at full capacity, is capable of delivering 235 cubic feet per minute of dry air at a temperature of 240 degrees F. with a gas consumption of 100 cubic feet per hour.

"The actual drying requires from four to five hours, during which 100 per cent of moisture within the product must be evaporated. Observation of this plant showed that when the heater was operating at full capacity it was capable of drying 300 pounds of sponges with a total gas consumption of 500 cubic feet in a five-hour period."

GAS MUST REPLACE COAL, SAYS REPORT TO WORLD C. OF C.

The largest supply of fuel in the world, including coal, oil and natural gas, lies within the borders of the United States, but within a few decades only the coal will be left, and radical changes in its use must be brought about, according to a report prepared for the third biennial meeting of the International Chamber of Commerce, to be held at Brussells, Belgium, in June.

On the Fuel Conservation Committee are George Otis Smith, Director of the U. S. Geological Survey; C. E. Lesher, editor of Coal Age; W. T. Coe, fuel expert of London; Van H. Manning of the American Petroleum Institute, and others. Future uses of fuel, as foreseen by the committee, will have to follow certain lines of development, among which are:

"Use of coal at the mines, there to be subjected to complete gasification or carbonization, with complete by-product recovery. The gas which results to be transmitted under high pressure to the point of use, where this point is not too distant. The coke to be used for the generation of electricity, to be transmitted at high tension to the point of use. Shipments from the mine to be mainly in the form of coke or coke briquettes.

"Electrification of railroads, using where possible hydro-electric power.

"Linking together of great central stations in a general electric network, with high tension transmission.

"Domestic heating by central plants or by gas or coke.

"Large use of gas for industrial heating from gas generated at the coal mines. Where this is not possible, use of coke.

"The power in industrial plants to be electrical, from central stations linked to the general electrical network.

"Much larger development of water power.

"Foolish, antiquated standards for heating requirements abandoned. Full use of gas from the mines, from blast furnaces and by-product coke-oven plants."

FUEL OF THE FUTURE

(Continued from page 91)

apply to a 1,100 B.t.u. gas before they can be used in the cauculation. It is apparent that there will not be required so large a consumption of gas for maintaining the holding temperature in the case of the high thermal value natural gas as for the case of the comparatively low thermal value coal gas. When this conversion has been made, it is possible to use the corrected figures in the calculation and the total consumption of gas required to maintain the holding temperatures of 1,500 and 1,800 degrees F. will be 1,490 cubic feet in the first case and 2,425 cubic feet in the second case.

Further Details of Calculations

Then, if there are 16 burners arranged on either side of the furnace, the total consumption of gas per burner is 1,490 divided by 16, or 94 cubic feet of a 1,100 B.t.u. gas. In order to convert this figure into terms of a 650 B.t.u. coal gas, it is just necessary to multiply it by the ratio 1100:650. As expected, the consumption of the lower thermal value gas will be higher, or 158 cubic feet per hour per burner in the furnace. The burners that were employed in the

furnace were 17 of the one and one-sixteenths size and one of the one and one-quarter inch size on each side. The large burner was installed near the door.

The temperature of the furnace will not fall below 500 to 600 degrees F. when it is being recharged. Therefore, there will be a certain amount of heat available in the brickwork and it will not be necessary to heat up cold brickwork to the working temperature each time the box annealing process is carried out. But in order to play safe in calculating the gaseous consumption, the industrial gas engineer assumed that the heating started in each case with the furnace cold and continued until a temperature of 1,800 degrees F. was obtained for each charge.

One figure that must be determined here is the weight of the brickwork. The surface area of the brickwork is 697 square feet and the thickness of the brick is six inches. Then as the brick weighs 130 pounds per square foot, the total weight of the brick is equal to $130 \times 697 \times 6/12$, or a total of 45,000 pounds.

Then the gas that is required to heat up the brick to the working temperature is found to be equal to 29,200 cubic feet of 1,100 B.t.u. gas, and inasmuch as weight of metal of the box is 30,000 and the B.t.u. per pound of steel at a temperature of 1,800 degrees F. is 313, the total amount of heat required for this purpose in the form of cubic feet of gaseous fuel is 17,600 cubic feet.

Heat in the Work

There finally remains to be considered the heat required to raise the temperature of the metal that is being annealed to 1,800 degrees F. At a temperature of 1,800 degrees F. there will be 242 B.t.u. of heat per pound in the metal nickel and 192 B.t.u. per pound in the case of the metal copper. Inasmuch as monel metal may be considered as a mixture of two parts nickel and one part copper, the B.t.u. in monel metal at a temperature of 1,800 degrees C. is equal to two-thirds of 242 plus one-third of 192, or a total of 225 B.t.u. per pound. The calculation then gives a total of 12,600 cubic feet of gas for heating up the monel metal to the working temperature. The total consumption of gas is, therefore, 12,600 plus 17,600 plus 29,200, or a grand total of 59,000 cubic feet.

Gas Consumed in Heating Extraneous Metal

One fact that is clearly demonstrated by this calculation is that a very great amount of gas is consumed, not so much in heating up the metal that is being worked, but in maintaining the metal at that temperature and in heating up the walls of the furnace and the container in which the metal is placed. Thus, in this particular case, the gas consumption for heating the metal is only a little over 21 per cent, and the rest, or 79 per cent of the gaseous consumption, is used for heating up the walls of the furnace and of the metal of the container. It must not be thought that this is intended as criticism of this installation, or, in fact, of many gaseous fuel installations, for it stands to reason that a certain amount of heat will always have to be consumed in heating up the walls of the furnace and other parts of the same, as well as the container in which the metal part is placed. This heat consumption is unavoidable. But it is clearly indicated that it is large when it is unavoidable and when proper precautions are taken to reduce it as far as possible. Hence, when no such care is taken, it must be enormous. It is so, as practical experience has shown, and it is for this reason that the attention of the industrial engineer is called constantly to the weight of extraneous metal in the heat treating furnace. This should be reduced as far as possible in order to avoid losing heat. It happens quite often that the mass of extraneous metal can be reduced very materially by properly designing the heating furnace, and when this is done the saving in fuel consumption is so great that it more than counterbalances the extra cost of gaseous fuel.

Welding of Knives with the Aid of Gas

While the welding process may not be considered strictly as a part of the heat treatment of metal, nevertheless, the subject is one that lends itself well to discussion at this point. The use of illuminating gas for the purpose of welding is an interesting application of gaseous fuel and one that has proved that the composition of the gas itself is no deterrent in its application to industrial purposes.

It was thought that some of the ingredients of the gaseous fuel made it unsuitable for welding purposes, but in designing the welding furnace the gas engineers worked along the lines that welding was produced solely as a result of temperature plus a furnace atmosphere that was slightly reducing at all points. Of course, there is a certain connection between the chemical composition of the gas and the results obtained in welding, but this is concerned with the production of a high enough flame temperature to make it possible to secure welding temperatures economically. Thus the composition of the gas must be such that the proper temperature can be obtained with the least difficulty and least expense.

Example of Welding

An example of a welding furnace in which gaseous fuel is employed is the one that is used in the manufacture of knives. In this case the knives consist of a slab of soft steel with a thin layer of tool steel which is welded to one face. The furnace in which the operation was carried out contained two working chambers. One of these was 32 inches deep and 14 inches wide and the other 48 inches deep and 20 inches wide. The height of both was 10 inches. There was also a preheating chamber which measured 48 inches deep by 12 inches wide by 16 inches high. This preheating chamber is located between the two working chambers. The working chambers were intended for separate or collective use, according to the size and quantity of work to be handled. The furnace is fired with high pressure burners and controlling devices are provided for measuring the quantity and quality of the gaseous mixture. The temperature within the working chamber was between 2,700 and 2,800 degrees F. The temperature in the preheating chamber was 1,800 degrees F.

Operation of the Furnace

The furnace was operated in the following manner: A pile of eight or ten soft steel slabs measuring $1.5 \times 8 \times 34$ inches is placed in the preheating cham-

ber at the beginning of the day's run. After the slabs have attained the proper temperature, one is removed, the surface is sprinkled with borax, and then placed in the working chamber. When the temperature of the slab has been raised to a point between 1,900 and 2,000 degrees F., it is removed and the scale is scraped off the surface. The strips of tool steel are then placed in position so that they are flush with one edge of the soft steel slab, and the whole is then sprinkled with borax. The piece is then replaced in the furnace and brought up to the welding temperature. It is then removed and welded under a power hammer. After the welding operation has been completed, the stock is brought to the desired thickness by passing it between a set of rolls. It often happens that the piece has to be heated several times before the welding and rolling operations are completed. After rolling the piece of welded metal is cooled, cut to size, hardened, tempered and ground.

The efficiency of this process has been proven to be very satisfactory.

Conclusion

The examples of heat treatment which have been given up to this point have clearly shown the manner in which gaseous fuel is used in these important fuel consuming operations. The heat treating industry is one in which gaseous fuel can find great use, and one in which it should be the supreme fuel. There is no question but that it will become the premier fuel of this industry if the properly designed furnaces are available. This is, in fact, a sine qua non of success in this field and it is really because the electrical companies have been willing to spend much time and money in developing efficient heat treating furnaces that electricity has had such great success in heat treatment, in spite of the fact that it is very much more costly, not only than coal or coke fuel, but gaseous fuel as well. What the electrical man has done, the gas mtn can do as well, especially in that it has been acknowledged that the heat treating field belongs rightly to gas.

SOME HOUSE HEATING EXPERIENCES

(Continued from page 96)

basis and estimate his consumption at 540,000 cubic feet of gas. Any estimate must necessarily be no more than an estimate and these figures will prove to be very close to the actual consumption. One word here in regard to the cost of heating with oil, 30,000 cubic feet of gas equals 200 gallons of oil as ordinarily burned. On this basis, when oil delivered in the customers' tanks costs more than 9¾ cents per gallon, it will cost more than gas at 65 cents.

The Conversion Problem

We have not attempted to make any conversions of coal burning boilers or furnaces because all the information we have been able to gather seemed to indicate the operating cost would be, at least, 20 per cent higher than when properly using a properly designed gas-burning appliance; 20 per cent of total fuel bill, using gas, would pay for the additional cost of the gas-burning appliance in a very short time. In case the customer does not wish to be dependent upon gas alone, it is possible to install the gas boiler alongside of the present coal boiler and operate either one, although this makes the installation considerably more expensive.

Garage Heating

We have recently become very interested in garage heating. There seems to be an enormous field open here if the proper appliance can be found. We had one customer using gas for heating in his garage this winter and his total bill at 65 cents per thousand amounted to less than $25. There are a number of satisfactory garage heaters on the market, but the matter of controlling the temperature has always been a difficult problem. There has recently appeared an electrically operated solenoid valve which, with a small, inexpensive thermostat, can be installed for $25. It seems to appear, therefore, that a thermostatically controlled garage heater can be installed for $75. plus the service piping. The cost of the installation and later operation are both so small as to make the field practically unlimited.

Curve in Gas Sales

I have prepared a curve showing our average sales for 1923 and 1924. The characteristics of this curve, with its June peak and low winter sales, illustrate how desirable the heating load is to us. I have estimated the amount of gas we would sell if we could get 10 per cent in one case and 20 per cent in another case, of the total heating business. Please notice how the curve flattens out as we take on more house-heating business. Also notice that we have not taxed either our producing or our holder capacity by this increased business.

It is true that if we get 20 per cent of the total heating business, our winter's sales would exceed our present summer sales, but by the time we could reach such a saturation point if it would ever be possible, the normal increase in our summer sales would undoubtedly be equal to and probably exceed the estimated winter sales with the house-heating load included. As 20 per cent of the heating business is a very high mark to shoot at, we need have no fears as to producing capacity. Reinforcement of our distribution system was necessary this year whether we had house-heating business or not and with this year's work completed, we will have something to worry about only coke is left.

Disposal of Coke

One-third of all the fuel used in Battle Creek is our coke, so if we get 10 per cent of the heating business, we will immediately have 2,600 tons to dispose of. Ten per cent of the total heating business would mean 234,000,000 cubic feet of gas. The sale of 1,000 cubic feet of gas gives us, after generator and boiler fuel are deducted, 81.9 pounds of coke to sell to the public. Consequently, the sale of 234 million cubic feet of gas would give us 9,582 tons, which, with the 2,600 tons previously

mentioned, makes a total of 12,182 tons of coke to be disposed of. In other words, if we could do 10 per cent of the total heating business, we would have 46.8 per cent more coke to dispose of in a 10 per cent smaller potential market. Should we ever get this amount of business, it would, undoubtedly, be necessary to reduce the B.t.u. standard and dilute the coal gas with blue gas, moving toward complete gasification in two stages.

Our experience in Battle Creek has demonstrated to our satisfaction, at least—

1—That gas at 65 cents is cheapter than the cost of hard coal with a furnace attendant.

2—That, generally, the cost of installing a gas-burning appliance is, at least, no more and in most cases less, than the cost of installing a good oil burner with tank capacity of 2,000 gallons.

3—That in a city where a low house-heating rate is possible through low production cost and characteristics of load factor, there is an almost unlimited field for house-heating.

I might say, by way of conclusion, that by the winter of 1926 we expect to have 50 house-heating customers burning an average of 600,000 cubic feet per year, which amounts to 5 per cent of our total annual sales.

MAKING IT EASY FOR CUSTOMERS TO PAY THEIR BILLS

(Continued from page 94)

"We have credited the remittance to your accounts, and the above mentioned balances will be added to your next bills."

Should the customer remit too much, through error in making the addition of several bills, proper refund is made by the company without request from the customer. If this credit exceeds 75 cents, a check for the amount is mailed to the customer with a letter of explanation. The average number of such checks in a month is 125. In instances where over-payments are less than 75 cents, the proper credits are shown on the regular bills next rendered the customers.

The average number of bills handled in one month is over 260,000, which includes all five ledger accounts.

Service Accounts

Gas and electric service accounts are entered and records filed according to street addresses in the six districts previously mentioned. The meter number is shown on the ledger opposite the customer's account. Excepting certain cases, meters are not changed, even though there be a change in the renting or ownership of a house or building. However, the other accounts, to which we have referred, are entered and filed according to the names of customers, as such accounts cover contracts with individuals regardless of changes of address that may be made by customers.

The necessity of carrying five accounts, as explained, makes it highly desirable for the customer, when remitting by mail, to make it clear what he is paying for. The best way is to attach the coupon for any bill to the check or money order. The receipt of a remittance unaccompanied by a coupon makes extra work for the company's ledger clerks. Occasionally, it is impossible to ascertain what account the mailer intended to pay.

On Non-Receipt of Coupon

If the customer fails to attach the coupon to a remittance, the company mails him a letter, as follows:

"We wish to acknowledge the receipt of your check, which was evidently tendered in payment of your gas and electric bills, although neither the bills nor the coupons thereof were enclosed with the check. Besides requiring us to make duplicate bills, in some cases where no address is given, we must determine the address by use of the telephone directory. You can readily see how this might result in some mistakes being made. In order that the possibility of making these mistakes may be avoided and that we may render you the best possible service, will you, in the future, please cut the coupon from the right-hand end of your bill and attach it to the check which you tender in payment? We can assure you your co-operation will confer on us a favor which will be greatly appreciated."

ANOTHER MUNICIPAL OWNERSHIP FAILURE

An audit of the books of Detroit's municipally owned street railway system by an auditor of the Rapid Transit Commission showed that, instead of a considerable profit, as had been continuously reported, there was a net deficit of $3,185,227. The following is a quotation from the Chicago Daily News that tells an interesting story of the failure of municipal operation:

"Among the comparatively few instances of municipal ownership and operation of street cars in the United States, that of Detroit has been held up as a conspicuous example of success. For many years the people of that city had wanted to own and operate the city's traction lines, largely because of the views of their former famous Mayor, Pingree. They made a start in 1920 by building 60 miles of municipally owned track and buying 30 miles of the track of the Detroit United Railway. Two years later, by a four to one vote, they authorized the purchase of the rest of the privately owned system and so came into possession of about 375 miles of street railway lines and the necessary equipment.

"Believing in and hoping for the success of their experiment, the citizens of Detroit were not surprised when the first annual report told them of a surplus of $1,000,000. However, on investigation by experienced operators of street car lines, that surplus proved to be merely a matter of bookkeep-

ing. It was shown that, had there been proper charges for depreciation, which no utility can escape by being municipally owned, there would have been a deficit of more than $1,000,000.

"Later official announcements of the success of the system have now been disproved by the report of an auditor on the financial condition of the lines. Despite recent statements that a profit was being shown, this report discloses a deficit of upward of $3,000,000. Money reported as having been set aside for certain reserves has not been so disposed of and the reserves exist only on paper. Officials responsible for the misleading information recently have been dismissed.

"In another respect the experiment has failed. The people of Detroit expected that under municipal operation fares would be lower. But the demands of street car workers for higher wages are no less insistent in the case of municipally owned than with privately owned companies. To meet the demand on the part of the employees of the line for more pay the fare was advanced from 5 to 6 cents, the charge of one cent extra for a transfer being maintained.

"Politics and the management of public utilities cannot be mixed to the advantage of the people. Business enterprises cannot be handled profitably by employees selected for political reasons. Detroit's experiment will not serve as a valid argument for municipal ownership and operation of street car lines."

MOTOR CAR MAKERS SET EXAMPLE USING GAS FOR FACTORY FUEL

The automobile industry, whose development and growth is roughly parallel to that of industrial gas, is now among the largest consumers of this fuel. Three-fourths of all the heat treatment of metals used in automobile manufacturing is now done with gas fuel. The most important recent application of gas fuel in this industry has been in the making of automatic die castings. The easy control of gas heat has made possible processes whereby castings can be made to conform to the most accurate specifications, without the machining formerly required. The use of regulated gas heat also prevents cracking of the original dies, which must be cooled after each casting to chill the new metal of the next. The alternate cooling and heating of the dies, unless done with extreme accuracy of temperature, quickly destroys them.

The present tremendous consumption of gas in industry has developed largely in the present century, and it is prophesied that by 1950 three-fourths, instead of the present one-fourth, of the country's production will be used for industrial heat, with one-fourth for domestic cooking and heating.

New York State leads the rest of the country in the use of gas, with a high record in 1924 of ninety-two billion cubic feet. In addition to its wide use in the factories of the Empire State, gas service is available to approximately nine million people throughout the state. Less than one hundred cubic feet of gas a day is consumed by the average family, with which more than half of all the food prepared is cooked, in addition to the water-heating and other tasks performed by this fuel supply.

ODD figures often attract folks to make purchases. It is surprising how many more sales may be made with a first or down payment of 99 cents on an article that usually carries a down payment of one dollar.

BULLETINS, or "pep" letters, as they are sometimes called, do not put push into salesmen unless there is a dollar sign in them. Bulletins of boost seldom do that. But offer a reward on business produced, for effort put out, and men will plug. Most men!

HAVE YOU AN IDEA?

The big thing in building a business is an idea. There is an idea back of every business success.

It may be an idea for a certain form of service, for a certain product, for a certain method of selling or of advertising, or of displaying merchandise.

The man who thought of putting a rubber tip on a lead pencil left a fortune of a quarter of a million because of that idea.

The man who devised a successful lemon squeezer got fifty thousand for his idea.

Two hundred thousand dollars in royalties have gone to the man who evolved the idea for an automatic ink well.

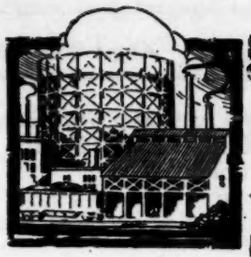
George M. Pullman became a rich man because of his idea that such a thing as a sleeping car was practical.

Thousands of instances could be enumerated of an idea making a man successful and wealthy.

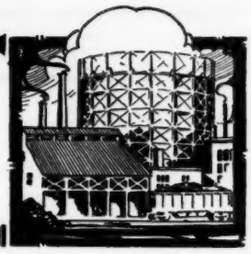
What idea have you evolved about the method of handling your business? If you have no original idea, it may be because you have just plodded along without thinking much about your business.

If you have no original and valuable idea, you may at least adopt the idea that it is worth while to make the best of using the ideas of others.

An idea, the judgment to decide correctly whether it is a sound idea, and the determination and courage to carry it out, will mean bigger business for you.



NEWS OF THE GAS INDUSTRY



Pacific Coast Gas Association to Hold 32nd Annual Convention

The program that will be presented at the 1925 convention of the Pacific Coast Gas Association is as follows:

Business Sessions

MONDAY, AUGUST 17

2 p. m.—General session. Address of welcome, Geo. L. Baker, Mayor of Portland. President's address, E. L. Hall, Portland Gas & Coke Co. General Business. Amendment of Constitution. Election of officers. Reports: Municipal Gas Ordinance, C. R. Miller, Portland Gas & Coke Co.; Appliance Certification, E. L. Hall; Affiliation with American Gas Association, E. L. Hall. New business.

FRIDAY, AUGUST 21

3 p. m.—Unfinished business.

4 p. m.—Executive session convenes. Official representatives of member companies are asked to meet with the officers of the association at this session for the purpose of discussing the activities of the association.

General Session

TUESDAY, AUGUST 18

9:30 a. m.—Paper, "Premium Systems," Donald E. Buyers, Portland Gas & Coke Co. Paper, "The Future Fuel for Gas Making," W. S. Yard, Pacific Gas & Electric Co. Address, "Selling Co-operative Advertising to an Industry," Chas. Duncan, Foster & Kleiser of California. Paper, "Intimate Public Relations," O. L. Moore, Los Angeles Gas & Electric Corporation. Paper, "Statistics; Their Value to the Operating Man and to the Executive," Rudolph Jenney, Pacific Gas & Electric Co. Report, Merchandising Bureau, Commercial Section, A. L. Crane, Gas Appliance Society of California. Illustrated talk, "Accomplishments in Selling Gas to Industry," J. H. Gumz, Pacific Gas & Electric Co.

Technical Section

TUESDAY, AUGUST 18
(2:00 p. m.)

Address of chairman—W. S. Yard, Pacific Gas & Electric Co.

Report of Purification Bureau—Frank Wills, chairman, Pacific Gas & Electric Co.

Committee Reports: Cottrell Process, F. J. Gartland, chairman, Public Service Co. of Colorado; Oxide Purification, F. C. Jones, chairman, Pacific Gas & Electric Co.; Tar and Lampblack, S. C. Schwarz, chairman, Portland Gas & Coke Co.; Naphthalene Removal, J. E. Spelce, chairman, Pacific Gas & Electric Co.; paper, Notes on Liquid Purification, K. N. Cundall, Pacific Gas & Electric Co.

Report of Natural Gas Bureau—A. F. Bridge, chairman, Southern Counties Gas Co.

Committee Reports: Transmission Line Capacity, F. F. Doyle, chairman, Mirway Gas Co.; Measurement of High Pressure Gas, H. P. George, chairman, Midway Gas Co.

Report of Safety Bureau—V. R. Hughes, chairman, Pacific Gas & Electric Co.

Report of Refractories Bureau—H. L. Masser, chairman, Los Angeles Gas & Electric Corporation.

Paper—"Refractory Problems in Oil Gas Manufacture," H. J. Knollman, Los Angeles Gas & Electric Corporation.

THURSDAY, AUGUST 20
(9:30 a. m.)

Report of Manufacturing Processes Bureau—Geo. Wehrle, chairman, Public Service Co. of Colorado.

Committee Reports: Oil Gas, J. M. Dickey, chairman, Pacific Gas & Electric Co.; Water Gas, F. C. Hawks, chairman, Tacoma Gas & Fuel Co.; Coal Gas, John Keillor, chairman, British Columbia Electric Railway Co., Ltd.; Reformed Gas, Frederic Hough, chairman, Southern Counties Gas Co.

Paper—"An Improved Oil Spray for Oil Gas Generators," J. E. Kelley, Western States Gas & Electric Co.

Paper—"Addition of Inert Gases to Increase Plant Capacity and Thermal Efficiency of the Reforming Process," Frederick Hough and J. R. McLaughlin, Southern Counties Gas Co.

Report of the Meter Bureau—J. E. Kelley, chairman, Western States Gas & Electric Co.

Committee Reports: Installations, W. D. Dickey, chairman, Pacific Meter Works; Diaphragms, Otto Goldkamp, chairman, San Diego Consolidated Gas & Electric Co.; Statistics, E. A. McCallum, chairman, Pacific Gas & Electric Co.

Report of Distribution Bureau—R. M. McCalley, chairman, Portland Gas & Coke Co.

Committee Reports: Unaccounted-for Gas, W. M. Henderson, chairman, Los Angeles Gas & Electric Corporation; High Pressure Distribution, R. R. Ripley, chairman, Portland Gas & Coke Co.; Materials, M. R. Thompson, chairman, Southern Counties Gas Co.; Pipe Protection, S. H. Graf, chairman, Oregon State Agricultural College.

Paper—"Protection of Underground Pipe," Dozier Finley, Paraffine Companies.

Paper—"The Extension of Pipe Life," H. S. Christopher, Southern California Gas Co.

Report of Steam Production Bureau—C. M. Cole, chairman, Southern California Gas Co.

Committee Reports: Boiler Fuels, F. H. Bivens, chairman, Southern Counties Gas Co.; Boiler Furnaces, E. M. Capell, chairman, Portland Gas & Coke Co.; Waste Heat Boilers, C. H. Wilcox, chair-

man, Los Angeles Gas & Electric Corporation.

Paper—"Reconstruction of a 1,500,000 Cubic Feet Gas Holder," R. M. McCalley, Portland Gas & Coke Co.

Commercial Section

TUESDAY, AUGUST 18
(2:00 p. m.)

Address of chairman—Geo. E. Whitwell, Byllesby Engineering & Management Corporation.

Report of Advertising Bureau—F. U. Naylor, chairman, Pacific Gas & Electric Co.

Report of Home Service Bureau—C. R. Miller, chairman, Portland Gas & Coke Co.

Report of Industrial Utilization Bureau—J. H. Gumz, chairman, Pacific Gas & Electric Co.

Committee Reports: Bakeries, H. S. Babb. chairman, Portland Gas & Coke Co.; Restaurants, W. R. Adams, Pacific Gas & Electric Co.; Steam Boilers, C. A. Carlson, Pacific Gas & Electric Co.

Accounting Section

THURSDAY, AUGUST 20
(9:30 a. m.)

Address of chairman—C. W. Platt, Portland Gas & Coke Co.

Report of Committee on Transportation Costs—D. G. Martin, chairman, Pacific Gas & Electric Co.

Paper—"Cost Keeping on Auxiliary Units," B. H. Parkinson, Portland Gas & Coke Co.

Report of Purchasing and Stores Bureau—E. N. Simmons, chairman, Los Angeles Gas & Electric Corporation.

Committee Reports: Purchasing, T. B. Parks, chairman, Los Angeles Gas & Electric Corporation; Warehousing, Wm. Maddock, chairman, Los Angeles Gas & Electric Corporation; Perpetual Inventories, W. C. F. West, chairman, Los Angeles Gas & Electric Corporation; Physical Inventories, B. H. Parkinson, chairman, Portland Gas & Coke Co.

Report of Customers' Bookkeeping Bureau—F. C. Ingram, chairman, Southern California Gas Co.

Report of Committee on Credits and Collections—F. L. Nagel, chairman, Portland Gas & Coke Co.

Report of Committee on Meter Reading—C. R. Johnson, chairman, Portland Gas & Coke Co.

Public Relations Section

FRIDAY, AUGUST 21
(9:30 a. m.)

Address of Chairman—Don C. Ray, Pacific Gas & Electric Co.

Report of Educational Bureau—C. A. Luckenbach, chairman, Los Angeles Gas & Electric Corporation.

Report of Co-operative Bureau—M. F. Wales, chairman, Coast Counties Gas & Electric Co.

Report of Customer Ownership Committee—S. E. Skelley, chairman, Portland Gas & Coke Co.

Report of Committee on Employees' Relations wtih the Public—W. H. Barton, chairman, Portland Gas & Coke Co.

Address—"Selling Public Relations to the Public," Norwood W. Brockett, Puget Sound Power & Light Co.

Report of Management Committee—E. G. McCann, chairman, Pacific Gas & Electric Co.

Address—"Relations—Public or Human," E. G. McCann, Pacific Gas & Electric Co.

Entertainment

Monday, 9:30 p. m.—Reception to officers; informal dancing.

Tuesday, 9 p. m.—A trip down the river on the good ship "Swan"; dancing and entertainment.

Wednesday (all day)—Mount Hood Loop Drive.

Thursday, 9 p. m.—Convention ball.

Friday, 6:30 p. m.—Annual banquet of Pacific Coast Gas Association.

Special Entertainment for Ladies

Monday, 4 p. m.—Tea in Gold Room.

Tuesday, 2 p. m.—Theater party at Orpheum Theater.

Thursday, 12 m.—Luncheon and card party at Crown Point Chalet on Columbia River Highway.

Friday, 2 p. m.—Scenic drive. Tea at Waverly Country Club.

Massachusetts Gas Companies Increase Earnings

Boston, Mass.—The combined net earnings available for common dividends of the subsidiary companies of the Massachusetts Gas Companies for the month of June, 1925, were $238,989, an increase of $33,248, or 16.16 per cent, compared with the corresponding month a year ago.

Industrial Use of Gas Cuts Pneumonia Death Rate, Says Committee

The nation wide campaign against smoke, soot and lost sunlight has taken on new vigor because of recent discoveries of the direct connection between smoke pollution and the death rate, says the Pennsylvania Public Service Information Committee.

Studies made by the Mellon Institute of Pittsburgh, the American Gas Association, and other agencies, are being used to make clear to the public the dangers incident to smoke-filled air.

Where pure, undiluted sunlight is plentiful, the disease factor is low, and it is found to be universally high wherever a perpetual film of smoke absorbs the sun's rays and prevents them from reaching the earth. Rickets, long thought to be a diet-deficiency disease, is now found to result much more directly from lack of sunlight.

In Pittsburgh the installation of gas-burning equipment in many industrial plants, and the use of smoke consuming devices has eliminated more than 50 per cent of the smoke, with a corresponding decrease in the number of pneumonia deaths.

A similar improvement in conditions is reported from Glasgow, Scotland, and in New York City the death rate from pulmonary causes has been cut in half in the last decade by regulations against smoke.

The development of gas-fired heating equipment is not only a potent factor in smoke elimination, but adds to community cleanliness by doing away with the hauling of coal and ashes through the streets.

Mrs. A. M. Humphrey Dies at Her New York City Home

New York, N. Y.—Kate Eastment Humphrey, wife of A. H. Humphrey, died at her home at the Hotel Ansonia, Broadway and 73rd street, on July 21. The funeral services were held July 23 at Kalamazoo, Mich.

Mrs. Humphrey was the wife of A. H. Humphrey, president of the General Gas Light Co., and the mother of Harold, Hubert, George and Helen Humphrey. Harold, Hubert and George are connected with the General Gas Light Co.

C. H. Quackenbush Now President of Advertising Club of Wilmington

Charles H. Quackenbush, formerly general manager of the St. Clair County Gas & Electric Co., East St. Louis and Belleville, Ill., and now general manager of the Wilmington, Del., Gas Co., has been elected president of the Wilmington Advertising Club. Mr. Quackenbush has always been interested in advertising and just prior to his removal to Wilmington from East St. Louis conducted an institutional campaign for the St. Clair properties in the newspapers in Belleville, East St. Louis, Collinsville and Edwardsville, Ill., that attracted the attention of gas men and advertising men all over the country.

Extension of Gas Service

Albany, N. Y.—The Public Service Commission has issued an order giving the Utica Gas & Electric Co. the right to construct an extension of its gas distribution system to serve the village of Clinton and the town of Kirkland, Oneida County, and exercise franchises granted by the two municipalities.

1925 Plan Book

A publication was recently issued by the American Gas Association entitled "The 1925 Plan Book," which contains the first section of the commercial section program, which has been developed for the purpose of helping gas companies build greater gas and appliance sales so as to bring about a 50 per cent increase in all sales in three years.

The basis of the entire plan is to develop co-operative selling efforts to a high degree of efficiency not heretofore achieved in the gas industry. The booklet describes the general program. First, the plan for the first year calls only for the participation of the gas companies and local branches or agents of manufacturing companies in regional and local activities. In the second and third years the plan includes further extension and subdivision of sales, promotional materials, education of builders and architects, greater stress on industrial gas sales, and, finally, the undertaking of a national advertising campaign over the name of the American Gas Association. The booklet also describes the manner in which the work is organized and gives a general outline of the new 1925 Gas Sales Stimulation Service for gas companies. This includes a set of 24 sales plans with copy and a series of sales news and data service comprising a number of bulletins on window and store displays, home service work, trade promotion, sales drives, etc.

Contracts Awarded

The Iron Mountain Gas Co., of Iron Mountain, Mich., has placed a contract with the Gas Machinery Co. for a new five-foot carburetted water gas apparatus, complete with overhead operating platform, electric fuel hoist equipment, motor-driven blower, steam and air meters and oil pump.

The contract also includes new duplex purifiers with gate valves and connections and auxiliary equipment.

All of the new machinery will be located in the new plant which the Iron Mountain Gas Co. is building about a half mile south of the present gas works location.

"Safety" Literature

"Maintaining Interest in Safety" is the subject of a pamphlet just issued by the National Safety Council, which points out that to start an accident prevention campaign is one task, but to maintain it in spirit requires enthusiastic effort. It is after the band stops playing and the parade is over that deep thought must be given the subject.

Every manufacturer, public utility concern and corporation should be interested in this new piece of literature, says W. Dean Keefer, chief engineer of the industrial division of the National Safety Council, who will be glad to send a copy of the leaflet free of charge to anyone who writes him at 168 North Michigan avenue, Chicago, Ill.

The booklet is illustrated with photographs, charts, etc. One item alone that is well worth reading is that part which tells of the intervals between the inspections of various items, some of which should be examined daily, others every six months and several only once a year.

Among the subjects covered in the pamphlet are: Starting a safety campaign, why it is necessary to maintain interest, program of activities, maintaining the interest of the management, superntendent, foremen and workers, selling new employees, bulletin boards, mass meetings, outings, playlets, distribution of printed matter, suggestion systems, schools, safety committees, board of inquiry, special contests, rule books, questions and answers, sharing ideas, the plant magazine, a safety quiz for superintendents, etc. Included also is a list of the titles of the various motion picture films that are being distributed by the institution.

Iroquois Gas Corp. Asks for Increase of Rate

Albany, N. Y.—The Iroquois Gas Corporation has filed a petition with the Public Service Commission for an order authorizing it to increase its rates for gas, and asking for an immediate temporary increase pending determination of a permanent rate. The petition alleges that, in order to earn a fair and reasonable return on the present fair value of its property, a net rate of at least 75 cents is necessary, and asks that that price be set as a temporary rate. It suggests a permanent rate of 80 cents per thousand cubic feet, with a discount of 5 cents per thousand cubic feet for prompt payment.

The present rate of 65 cents per thousand cubic feet was fixed by order of the commission, September 11, 1922, the rate providing for a discount of 5 cents for prompt payment. The corporation claims that since 1923 it has expanded upwards of $4,000,000 in construction of a new artificial gas plant on the outskirts of Buffalo, which began producing gas in October, 1924. It claims that net capital additions to its plant since January 1, 1923, have cost $7,713,107, and that the present fair and reasonable value of the entire property is $40,000,000. Extensions and improvements of the distribution system now contemplated will cost $1,600,000, the petition states.

Worcester Gas Light Co. to Extend Business

Worcester, Mass.—The Worcester Gas Light Co. has been granted permission by the Public Utilities Commission of Massachusetts, State House, Boston, to extend its business into the Cherry Valley section of Leicester. The order handed down by the commission reads as follows:

"This is a petition of the Worcester Gas Light Co. for authority to carry on the business of furnishing and selling gas for light and other purposes in that section of the town of Leicester known as Cherry Valley. This company was created by special law and granted the right to furnish gas in the city of Worcester and is now carrying on its business therein. Under date of May 8, 1925, the department authorized the company to carry on the business for which it is incorporated in the towns of Auburn, Millbury and Shrewsbury. The Spencer Gas Co. supplies gas to a portion of the town of Leicester at present and is authorized to supply gas to the entire town. No objection is made by that company to the Worcester company's entry to the Cherry Valley section of Leicester. After notice and public hearing, at which representatives of the town were present and urged favorable action upon the petition, we are of the opinion that the furnishing of gas as set forth in the company's petition would serve the public convenience. Accordingly, it is ordered that the Worcester Gas Light Co. be and it is hereby authorized to carry on the business for which it is incorporated in that section of the town of Leicester known as Cherry Valley as far westerly as Waite street, opposite the Catholic church, but in no other part of said town, with all the rights, powers and privileges and subject to the duties and liabilities set forth in laws now or hereafter in force applicable thereto."

Laclede-Christy Clay Products Announces Changes

St. Louis, Mo.—The Laclede-Christy Clay Products Co. announces the following changes in personnel: W. J. Westphalen, vice-president and treasurer; J. H. McKelvey, vice-president in charge of sales; J. M. Baggot, secretary, and H. L. Inger, assistant secretary.

Smokeless City Here to Stay

The fear that cities which have freed themselves from the smoke nuisance with the aid of natural gas may have to go back to the days of a disease-ridden and soot-laden atmosphere, when the failing present supply of natural gas is gone, has been allayed by a recent report of the American Gas Association.

The association reports that the manufactured gas companies of the country are rapidly preparing themselves to take on the heating load now being carried by natural gas, and it is believed to be a reasonable assumption that within the next ten years manufactured gas will supersede as much as 20 per cent of the present supply of natural gas in the ten states east of the Mississippi that have this fuel. This means that an additional 80,000,000,000 cubic feet of manufactured gas would be made to substitute for natural gas.

In at least two cases, in Ashtabula, Ohio, and Elmira, N. Y., companies formerly supplying natural gas have built plants and converted their lines almost entirely to carry the manufactured product. A number of other companies, notably the Equitable Gas Co. of Pittsburgh, the Union Gas & Electric Co. of Cincinnati and the companies supplying the cities of Cleveland and Columbus, Ohio; Erie, Jamestown and McKeesport, Pa., Buffalo, N. Y., Richmond, Ind., and Hamilton, Ont., have constructed gas plants to augment the failing natural supplies.

The establishment of scientific rate structures for industrial gas users and improvements tending toward increased efficiency which are being rapidly made in the manufacture and installation of gas-heating appliances will keep these cities free from smoke and will tend to abolish the nuisance in other municipalities as well.

New Gas Corporation

Albany, N. Y.—Ramapo Gas Corporation, village of Suffern, town of Ramapo, Rockland County, N. Y., has been chartered by the Secretary of State to supply gas for lighting and power at a capital of $200,000, divided into 10,000 shares common stock, $10 par value, and 2,000 shares preferred stock, $50 par value. John F. and Emma S. Barnard and Anne M. Sutherland, Goshen, N. Y., are directors and subscribers. Joseph W. and Percy V. D. Gott, Goshen, N. Y., are attorneys for the corporation.

New Office for Southbridge, Mass.

Southbridge, Mass.—The Webster & Southbridge Gas & Electric Co. has purchased the land owned by Blanchard Bros., on Elm street, and plan to erect a modern office building and garage on the premises. The deal involved about $15,000. The deal was negotiated by Albert E. Shaw, superintendent of the utility company.

Missouri Gas Rate Upheld

Alanson P. Lathrop, president of the American Light & Traction Co., announced recently that the Supreme Court of Missouri had handed down an opinion in favor of the St. Joseph Gas Co., an American Co. subsidiary.

The decision, he said, sustains increased gas rates put into effect in November, 1920, by authority of the Public Service Commission of Missouri. The decision is a substantial victory for the subsidiary and the commission.

The American Light & Traction's Detroit gas subsidiary, the Detroit City Gas Co., was likewise favored recently.

How About the Other 50,000,000?

Latest figures of the gas industry show that approximately 50,000,000 persons in the United States are supplied with manufactured gas and 16,000,000 persons with natural gas. This leaves nearly 50,000,000 persons without gas service of any kind.

Economies in gas making and distribution make probable a rapid expansion of the industry, leaders say. This will not only meet the increased use of those now served, but will make gas available to many more people, they claim.

F. L. Marshall in Automobile Business

F. L. Marshall, formerly general manager of the Gas Light Co. of Augusta, Ga., has embarked in the automobile business in that city. Mr. Marshall has been in the gas business all his life and it is not strange that when he gets out of the "Gaz" business that he gets into another that must have "Gas" to get it started and a gas man to keep it going."